REMARKS

Applicant respectfully requests reconsideration of this application. Claims 1-26 are currently pending.

Claims 1, 3-5, 7-11, 13-23, 25, and 26 have been amended. Claims 2, 6, 12, and 24 have been cancelled without prejudice. No claims have been added.

Therefore, claims 1, 3-5, 7-11, 13-23, 25, and 26 are now presented for examination.

Claim Rejection under 35 U.S.C. §103

Calamvokis et al. in view of Hashemi et al.

The Examiner rejected claims 1-7, 11-13, 16-18 and 20-26 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,856,622 of Calamvokis et al., ("*Calamvokis*") in view of "A Multicast Single-Queue Switch with a Novel Copy Mechanism" of Hashemi et al. ("*Hashemi*"). Claims 2, 6, 12, and 24 have been cancelled without prejudice.

As amended here, Claim 1 is as follows:

> 1. A method for multicasting a data cell received in a crossbar switch structure, comprising:
>
> registering an address and priority corresponding to the data cell at an ingress port in a memory cell, the memory cell being addressable by the priority of the data cell, the ingress port being one of a plurality of ingress ports for the crossbar switch;
>
> controlling a flow of the data cell based on the priority of the data cell;
>
> asserting a multicast service request for the data cell using the memory cell;

in response to the asserting of the multicast service request, comparing a request priority for the data cell with request priorities of one or more other multicast data cells asserted for ingress ports of the crossbar switch;

responsive to the comparing of request priorities, selecting the data cell for transmission and granting the multicast service request for the ingress port;

arranging a multicast fan-out for the data cell; and

in response to the arranging of the multicast fan-out for the data cell, configuring the crossbar switch structure for the transfer of the data cell to a plurality of egress ports of the crossbar switch.

In addition to other differences with the references, it is submitted that neither reference provides for asserting a multicast service request for the data cell using the memory cell; and in response to the asserting of the multicast service request, comparing a request priority for the data cell with request priorities of one or more other multicast data cells asserted for ingress ports of the crossbar switch; and responsive to the comparing of request priorities, selecting the data cell for transmission and granting the multicast service request for the ingress port.

As was discussed in the previous response, *Calamvokis* relates to scheduling of multicast data cells, specifically regarding a method of facilitating the scheduling of a first multicast request signal of a series of multicast request signals. However, *Calamvokis* is concerned with multicast cells of a particular type (having a particular label) sharing a queue with cells of a different label, thus potentially resulting in head of line blocking even if the blocked cells' outputs are currently free. As indicated in the prior response, the operation of a system in *Calamvokis* to address this problem may be seen in, for example, Figure 1 of *Calamvokis*, in which an ingress linecard 108A is

interfaced with an ingress port 102A of a switch core 100. This is further illustrated in Figure 2 of *Calamvokis*, which illustrates linecard 108A as including multiple output queues, with one queue being provided per priority. Thus, in contrast to the process described in Claim 1 of the current application, *Calamvokis* is suggesting the continued use of numerous queues to separate priorities. As indicated, it is assumed for Figure 2 that ingress linecard 108A holds a multicast cell to send to egress linecards 108B at priority 0. (*Calamvokis*, col. 4, lines 39-41) In this process, there is a check to determine whether the linecard has sufficient multicast queue credits to send a request to the core, and when the credits are available, an LCS request is made indicating that linecard 108A is sending a priority 0 multicast cell. (*Calamvokis*, col. 4, lines 44-49) Continuing:

> (B) When ingress switch port 102A receives the LCS Request, it adds the request to a multicast FIFO for priority 0. Switch port 102A sends a request to scheduler subsystem 106 indicating that linecard 108A is to send a priority 0 multicast cell with label M.

(*Calamvokis*, col. 4, lines 50-54) Thus, the system does provide for the specific transmission of a cell with a particular label (M) out of a queue, but the queue is of a particular priority. There is a multicast FIFO for each priority, thus requiring numerous queues for cells to be transferred. There is no indication the priority is stored in memory cells for the data cells, or that the memory cells are addressable by priority. Rather, the cells are directed by priority to the relevant queue.

With regard to priority, as is further described in *Calamvokis*, the scheduler subsystem provided may include multiple separate priority planes, with each priority plane described as containing an array of scheduler chips:

> As illustrated in FIG. 4 and discussed above, scheduler subsystem 106 comprises up to four separate priority planes 118. Scheduler subsystem 106 may, alternatively, comprise more than four priority planes as requirements demand. Each priority plane 118 contains an array 121 of scheduler chips (X-SCH) 120 that together form a single-priority scheduler. Each priority plane 118 further comprises a set of fanout roster storage chips (X-FIT) 122 that store a multicast fanout table (not shown) and, by referring to this fanout table, select multicast fanouts based on multicast labels associated with LCS requests. FIG. 4 further illustrates the arrangement of X-SCH and X-FIT chips 122 needed to build a four priority 256x256 scheduler with a fifth redundant plane.

(*Calamvokis*, col. 7, lines 6-19) There is no suggestion in this discussion regarding the recordation of priority in memory cells, as is provided in Claim 1 of the present application.

Further, *Calamvokis* does not provide for the assertion a multicast service request for said data cell using the memory cell, as provided in Claim 1 of the present application. As shown above, *Calamvokis* does not describe such memory cells. As further shown above, the system in *Calamvokis* provides for an ingress switch port receiving a request from a linecard, with the ingress switch port adding the request to a multicast FIFO for the appropriate priority. The switch port sends a request to a scheduler subsystem, and the scheduler subsystem determines a configuration for the crossbar switch, and sends a grant to switch port indicating when the data cell is needed. (*Calamvokis*, col. 4, lines 44-65) There does not appear to be any suggestion in *Calamvokis* of the element of claim 1 regarding the assertion of a multicast service request for the data cell using the memory cell.

The Office Action then cites to *Hashemi*, an academic article regarding a multicast single-queue ATM (asynchronous transfer mode) switch. What this reference intends is that "[m]ultiple logical output queues, include a new queue for multicast and broadcast cells, are all interleaved into a single physical buffer as in the single-queue switch architecture … Cells are scheduled in the multicast queue based on their priority level and service type as in the unicast queues". (*Hashemi*, p. 800, left col., 1st ¶) The reference does not appear to address crossbar switches and thus is not directly applicable to the claims.

The *Hashemi* reference does not provide the elements of the claims shown to be missing from *Calamvokis* for at least the following reasons:

The *Hashemi* reference does not regard a comparison of request priorities of multicast cells from the multiple inputs of a crossbar switch. *Hashemi* only discusses the priority of cells within a queue, and thus does not regard the comparison of data cells from different input ports. Thus, *Hashemi* does not describe the operation provided in claim 1 in which there is an assertion of a multicast service request and a comparison of a request priority of the data cell with request priorities of one or more other multicast data cells.

The *Hashemi* reference indicates that unicast cell in a given output queue can still be sent if it has a higher priority than a multicast cell. However, this does not provide any teaching regarding the transmission of unicast cells as provided in claim 8 (which is actually rejected below), in which there is a determination that the data cell is not immediately departing, a determination that a unicast cell is ready for launch, and the

launching of the unicast cell prior to the launching of the data cell. Further, as provided in claim 5, the service priority of the unicast cell may be lower than the data cell.

Thus, neither *Calamvokis* nor *Hashemi* teaches or reasonably suggests the elements of the Claim 1. Claim 1 thus is patentable over the combination of *Calamvokis* and *Hashemi*. The arguments presented above are also applicable to independent claims 11 and 22, and thus such claims are also allowable. The remaining claims are dependent claims that are allowable as being dependent on the allowable base claims.

Claim Rejection under 35 U.S.C. §103

Calamvokis et al., Hashemi et al., in view of Hughes et al.

The Examiner rejected claims 8-9 and 19 under 35 U.S.C. 103(a) as being unpatentable over *Calamvokis* in view of *Hashemi* and in further view of U.S Patent No. 6,747,971 of Hughes et al. ("*Hughes*").

The rejected claims are dependent claims and, in addition to other differences with the cited art, are allowable as being dependent on the allowable base claims.

The *Hughes* reference regards a crosspoint switch with independent schedulers. The operation of the independent schedulers for each switch planes does not appear to be relevant to the relevant claim elements shown above to be missing from *Calamvokis* and *Hashemi*.

As indicated in *Hughes*, a dedicated scheduler may further include a pointer to determine priority between multicast and unicast traffic, a pointer to determine priority between contending input control ports having multicast traffic, and/or a pointer for each of the output control ports to determine priority between contending input control ports having unicast traffic. As the system is described, the pointers determine priority, which

is a different kind of priority determination than provided in Claim 1. Rather comparing priorities, the pointers appear to provide a priority. Further, the establishment of a priority for unicast and multicast cells does not provide for transmission of a unicast cell that has a lower priority than the multicast cell when the multicast cell is not departing immediately.

Thus, *Hughes* does not teach or reasonably suggest the elements of the rejected claims. The rejected claims thus are patentable over the combination of *Calamvokis*, *Hashemi*, and *Hughes*.

Claim Rejection under 35 U.S.C. §103

Calamvokis et al., Hashemi et al., in view of Beshai et al.

The Examiner rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over *Calamvokis* in view of *Hashemi* and in further view of U.S Patent No. 7,000,026 of Beshai et al. ("*Beshai*").

The rejected claims are dependent claims and, in addition to other differences with the cited art, are allowable as being dependent on the allowable base claims.

The *Beshai* reference regards multi-channel sharing in a high-capacity network. and providing for transferring data segments of a data stream across multi-channel links in a high-quality network. The reference does not appear to teach or suggest the claim elements shown to be missing from the cited references above.

Thus, *Beshai* does not teach or reasonably suggest the elements of the rejected claims. The rejected claims thus are patentable over the combination of *Calamvokis*, *Hashemi*, and *Beshai*.

Claim Rejection under 35 U.S.C. §103

Calamvokis et al. in view of Luijten et al.

The Examiner rejected claims 14-15 under 35 U.S.C. 103(a) as being unpatentable over *Calamvokis* in view of U.S Patent No. 6,324,164 of Luijten et al. ("*Luijten*").

The rejected claims are dependent claims and, in addition to other differences with the cited art, are allowable as being dependent on the allowable base claims.

The *Luijten* regards an ATM protocol intended to operation with high speed switching systems.. The reference does not appear to teach or suggest the claim elements shown to be missing from the cited references above.

Thus, *Luijten* does not teach or reasonably suggest the elements of the rejected claims. The rejected claims thus are patentable over the combination of *Calamvokis* and *Luijten*.

Conclusion

Applicant respectfully submits that the rejections have been overcome by the amendment and remark, and that the claims as amended are now in condition for allowance. Accordingly, Applicant respectfully requests the rejections be withdrawn and the claims as amended be allowed.

Invitation for a Telephone Interview

The Examiner is requested to call the undersigned at (503) 439-8778 if there remains any issue with allowance of the case.

Request for an Extension of Time

The Applicant respectfully petitions for a one-month extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a). Please charge the fee for such extension to our Deposit Account No. 02-2666.

Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: May 28, 2008

/Mark C. Van Ness/
Mark C. Van Ness
Reg. No. 39,865

1279 Oakmead Parkway
Sunnyvale, CA 94085-4040
(503) 439-8778